Miscellaneous Report No. 38

PHOTO-INTERPRETATION AIDS

By

Clarence D. Chase and Stephen H. Spurr

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Lake States Forest Experiment Station

1955

U. S. Department of Agriculture, Forest Service
Lake States Forest Experiment Station 1/

Miscellaneous Report No. 38 March 1955

PHOTO-INTERPRETATION AIDS

By

Clarence D. Chase 2/ and Stephen H. Spurr 3/

INTRODUCTION

The great increase in the use of aerial photography in forestry following World War II was accompanied by a rapid development of instruments and scales to facilitate photo-interpretation. Many aids were soon available, but few foresters knew much about them or how to acquire them. Recognizing this, the Lake States Forest Experiment Station in 1948 prepared a list of photo-interpretation aids, giving their source and cost. Although the list was intended for in-service use, it received rather wide distribution and apparently fulfilled a real need.

In 1953, the authors of this report began revising and expanding the list. They mailed form letters to all known manufacturers and distributors of photo-interpretation aids and to a selected list of institutions and individuals. The resulting list was restricted to inexpensive items and excludes aids made by an organization solely for its own use. Each citation was later submitted to the manufacturer or distributor for verification. Availability of items, their specifications, and cost are subject to change but the list should be of value to photo-interpreters for some time. Inclusion or exclusion from the list does not indicate the recommendation or rejection of any item. The authors would be glad to have their attention called to any important omission.

1/ Maintained at St. Paul 1, Minnesota, in cooperation with the University of Minnesota.

2/ Forester, Lake States Forest Experiment Station

3/ Professor of Silviculture, University of Michigan, Ann Arbor, Michigan.

USDA-SCS-MILWAUKEE, WIS.1955

The photo-interpretation aids are classified under several headings: Lens Stereoscopes, Reflecting Stereoscopes, Parallax Devices, Linear and Multiple Use Scales Area Measurement Aids, and Miscellaneous Aids.

Several U. S. Forest Service sources provide a number of items. To save space, the address and certain additional information are shown below instead of being given for each item:

1. Pacific Northwest Forest and Range Experiment Station:

Survey aids designed at this station may be obtained from Delano Aerial Surveys, 1536 S. E. 11th Street, Portland, Oregon. Aid No. 6 is priced at $1.50. The price of any other item is $1.00 each; quantities of four or more (any combination except No. 6) are $2.50 per four.

2. U. S. Forest Service, Milwaukee, Wisconsin:

For aids obtainable from this source, write to Regional Forester, U. S. Forest Service, Madison Building, 623 N. Second Street, Milwaukee 3, Wisconsin. Use form 184b-R9. Minimum charge $1.00

3. U. S. Forest Service, Washington, D. C.:

For aids obtainable from this source, write to U. S. Forest Service, Division of Engineering, Washington 25, D. C. Minimum charge $1.00.

LENS STEREOSCOPES

Lens Stereoscope, Abrams Model CF-8. Folding lens stereoscope with case. Lenses are 4-3/4 inches in focal length, giving 2-power magnification. Weight 8 oz. with case. Abrams Instrument Corp., 600-620 East Shiawassee St., Lansing, Mich. $10.50 postpaid.

Lens Stereoscope, Abrams. Model CB-1. Dual lens type. Quickly adjustable for either 2- or 4-power use. Cast nylon frame and foam rubber headrest. Abrams Instrument Corp., 600-620 East Shiawassee St., Lansing, Mich. $36.00.

Lens Stereoscope Abrams. Prototype Model X-S1F. Provides 2-, 4-, and 6-power magnification. Doublet and triplet lenses provide a precision optical system mounted in sturdy castings. Wood carrying case included. Abrams Instrument Corp., 600-620 East Shiawassee St., Lansing, Mich.

Lens Stereoscope, Fairchild. Model F-271. Legs and lenses fold into recesses in the die-cast instrument body to form a light-weight portable unit smaller than the ordinary eyeglass case. Interpupillary adjustment. Tripod leg design. Fairchild Camera and Instrument Corp., Robbins Lane, Syosset, Long Island, N. Y. $9.75.

Lens Stereoscope, Meyer-Opticraft. Folding lens stereoscope with leather case. Lenses are 4½-inch focal length, giving 2-power magnification. Weight 8 oz. Meyer-Opticraft, Inc., 39 W. 60th St., New York 23, N. Y. $4.80.

Lens Stereoscope, Ryker. Model D-10. Offered in 3 different lens types and 4 base-mounts, all interchangeable. Cat. No. 4 with 6 dioptersperical lenses, support rod, and Masonite base sells for $15.20. Cat. No. 1 with prismatic lenses, support rod, and counterweight office base sells for $34.40. Intermediate models available. Harrison C. Ryker, Inc., 843 Thirty-fifth Ave., Oakland 1, California. Quantity discounts in lots of 3 or more.

Lens Stereoscope, Stratex. 4-power magnification; folds to 4-3/4 inches; baked enamel finish; leather case; weight 5 oz. Adjustable for interpupillary distance. Forestry Enterprises, 1740 K Street N. W., Washington 6, D. C. $12.00 with leather case. Quantity-lot discounts.

Lens Stereoscope, Zeiss. Model 6001 without case; 6002 with case. Simple lens stereoscope without interpupillary adjustment. Lens, nearly 1 inch in diameter, affords a good stereoscopic effect to observers with widely varying eye-base. Focal length of lenses is about 3½ inches giving about 2.8-power magnification. Carl Zeiss, Inc., 485 Fifth Ave., New York, N. Y. $4.50 without case; $6.00 with leather case.

Lens Stereoscope, Parallel. Abrams CF-8 stereoscope in parallel-motion mount swung over metal mounting board. Magnets supplied for holding photographs down. Engineering Services, 3920 - 36th Ave. South, Minneapolis 6, Minn. $65.00.

Stand for Lens Stereoscope. Spreading support for Abrams CF-8 type lens stereoscope permitting manipulation of photographs without interference by the stereoscope legs. Price Machine Works, Spartanburg, S. C. About $3.25 in quantity lots.

Lens Stereoscope, With Holder. Eye-piece casting which can be positioned above a hardboard base by a jointed arm (allowing unrestricted work on photographs). Either one or two sets of ± 6.00 diopter lenses may be used in the eye-piece casting. With one set, lenses focus at about 6½ inches above the photos; with two sets, additional magnification is achieved about 3¼ inches above the photos. Letha M. Voight, 113 Caledonia Street, Sausalito, California. $11.00 with one set of lenses or $13.50 with two sets.

REFLECTING STEREOSCOPES

Mirror Stereoscope, Fairchild. Model F-71. Rhodium-coated first-surface mirrors. Complete with carrying case but without binoculars. Fairchild Camera and Instrument Corp., Robbins Lane, Syosset, Long Island, N. Y. $150.00.

Mirror Stereoscope, Ryker. Model M-11-X. Reflecting stereoscopes with first-surface aluminum-quartz mirrors. Model M-11-X-2 with 2.5 diopter lenses added sells for $72.00. Also available with binocular attachment, 4-power. Model M-11 stereoscopes offer added features at $102.00 up. Harrison C. Ryker, Inc., 843 Thirty-fifth Ave., Oakland 1, California. Quantity discounts in lots of 3 or more.

Mirror Stereoscope, Wild. Precision-built Swiss instrument with unusually wide field view. Model ST-3 in carrying case, $205.00. Binocular attachment with 3-power magnification available as supplementary equipment. Henry Wild Surveying Instruments Supply Company of America, Inc., Main and Covert Streets, Port Washington, N. Y.

Mirror Stereoscope, Zeiss. First-surfaced mirror reflecting stereoscope. No. 6005 is simple stereoscope with removable legs. No. 6011 is same instrument with case, $153.00. Extra equipment available includes binocular attachment, and parallax bar (tracing stereometer). Carl Zeiss, Inc., 485 Fifth Avenue, New York, N. Y.

R6-50 Stereoscope. A mirror stereoscope consisting of a fixed head (lenses and first-surface mirrors) and a tripod base. A board base may be substituted for the tripod if desired. Regional Forester, R-6, U. S. Forest Service, P. O. Box 4137, Portland, Oregon. $25.73 f.o.b. Portland, plus 15 percent handling charge to purchasers other than the Forest Service.

PARALLAX DEVICES

Parallax Wedge. Original Harvard model. Printed with red dots on heavy plastic. Available in two eye-base models: Narrow, 1.8-2.2 inches; wide, 2.1-2.5 inches. Robinson Aerial Surveys, Inc., 418-426 Central Avenue, Newark 7, New Jersey. $2.50.

Parallax Wedges. Printed in red or black line on transparent film. Available in six eye-base ranges: 1.80-2.15; 2.15-2.50; 2.50-2.80; 2.80-3.15; 3.15-3.50; 3.50-3.80. U. S. Forest Service, Washington, D. C.* $0 90.

Height Finder, Abrams. Model HF-2. Simplified parallax bar attachment for Abrams lens stereoscopes. In leather case. Abrams Instrument Corp., 600-620 East Shiawassee St., Lansing, Mich $35.00.

Photogrammetric Computer. Plastic circular slide-rule-type computer for solution of parallax equations. Companion to Abrams HF-2 Height Finder. Abrams Instrument Corp., 600-620 East Shiawassee St., Lansing, Mich. $2.00.

Parallax Bar (Stereometer), Wild. For Wild and similar mirror stereoscopes. $100 00. Henry Wild Surveying Instruments Supply Company of America, Inc., Main and Covert Streets, Port Washington, N. Y.

Parallax Bar (Stereometer), Zeiss. For use with Zeiss and similar mirror stereoscopes. Measuring range of parallax screw is 35 mm. but can be extended another 15 mm. Micrometer scale is graduated in 0.005 mm. and can be estimated to 0.001 mm. No. 6007 includes stereometer with pencil lead holder, steel needles, and tracing leads, $107.00. No. 6014 is same equipment with case, $114.00. Carl Zeiss, Inc., 485 Fifth Ave., New York, N. Y.

Parallax Difference Alinement Chart. Graphical solution of the parallax formula in alinement chart form for a focal length of 8¼ inches. Developed by A. W. Goodspeed and described in 1949 Ames Forester. Iowa State College Book Store, Ames, Iowa. About $0.06.

Stereo Elevation Meter. For determining the elevational difference in terrain without resorting to mathematical computations. After setting the instrument it can be used to read directly vertical distances for any number of points within the stereoscopic coverage field of view. Photogrammetry, Inc., 901 Pershing Drive, Silver Springs, Maryland.

Stereo Slope Meter. For use with airphotos of various focal lengths, flying heights, and overlaps. The maximum readable slope has been increased to 50 percent. Models for both lens and mirror stereoscopes are available. Photogrammetry, Inc., 901 Pershing Drive, Silver Springs, Maryland.

---

* See page 2 for complete address.

LINEAR AND MULTIPLE-USE SCALES

University of Michigan Photo-Interpreter's Scale. An assemblage on clear film of a number of aids which photo-interpreters can use under lens stereoscope. Separate overlays are available for scales of 1:20,000; 1:17,000; 1:16,000; and 1:15,840. Each overlay contains scales, micrometer wedge, crown closure gauge, crown diameter dot wedge, circles for various standard-size circular plots, dot grid with 40 dots per 40 acres, and standard section with each 40 subdivided into 100 small squares. School of Natural Resources, University of Michigan, Ann Arbor, Mich. $1.00.

Boggs' Natural Scale Indicator. For use in scaling maps, regardless of language or unit of measure. The Natural Scale Indicator provides four scales from which the natural scale can be read to one degree of latitude, 1,000 feet, one statute mile, or one kilometer. Complete instructions are given. C. S. Hamond & Co., 1521 Fifth Ave., New York 17, N. Y. $0.25.

Fan of Linear Scales in Hundreds of Feet from 3" = 1 mile to 8" = 1 mile. May be used to determine photo scale when distance between ground points is known, or to measure distances when scale is known. Printed on positive film 7" x 10". U. S. Forest Service, Milwaukee, Wisconsin.*

Photo-Chainage Scale (Range 1:10,000 to 1:24,000). For determining photo scale between known points or for measuring distances in chains at any known scale within range. Red ozachrome lines on clear film. Rogers and Company (Attention Mr. Schullberg), 815 Marquette Avenue, Minneapolis 2, Minn. $0.65.

Air Photo Scale-Finder. A transparency rule for (1) determining the scale of aerial photos from 1:100,000 to 1:10,000 by measuring between section lines, or (2) measuring photo distance in inches and converting to horizontal distance in feet. D. H. Elliott, Casper, Wyoming. $0.40.

---

* See page 2 for complete address.

Aerial Photo Scales. Provides for measuring scale of photos; stereo-base in inches and tenths; and chainage to nearest 1/2 chain and size of 1/5-acre and 1-acre plots for each of the following scales. Printed on transparent film in red or black.

Scales on a sheet	Sheet size	Cost per sheet
1:10,000; 10,500; 11,000; 11,500	6½" x 8½"	$1.30
1:15,000; 15,500; 16,000; 16,500	5 x 7	1.10
1:16,500; 17,000; 17,500; 18,000	5 x 7	1.10
1:18,000; 20,000; 21,000; 23,000	5 x 7	1.10

Order from U. S. Forest Service, Washington, D. C.*

Units of Measurement at Selected Scales. Transparent scales printed on heavy film in chains, miles, and feet. Areas shown for 1/5-acre and 1-acre circular plots and for 5- and 40-acre rectangular plots.

1:20,000 scale - Timber Survey Aid No. 1

1:12,000 scale - Timber Survey Aid No. 7

1:30,000 scale - Timber Survey Aid No. 8

1:40,000 scale - Timber Survey Aid No. 9

1:15,840 scale - Timber Survey Aid No.10

Pacific Northwest Forest & Range Experiment Station.*

Multiple Photo Scales. These scales, printed on transparent film, facilitate measurement of distance at any photo scale between 1:8,000 and 1:40,000.

Timber Survey Aid No. 11 - Scales in miles and hundredths of a mile.

Timber Survey Aid No. 12 - Scales in hundred feet.

Timber Survey Aid No. 13 - Scales in chains.

Pacific Northwest Forest & Range Experiment Station.*

---

* See page 2 for complete address.

Aerial Photo Scale-Protractor. Photo scales 1:19,500; 1:20,000; 1:20,500; 1:21,000; 1:21,500; 1:22,000; and 1:22,500--all printed on transparent film with 1/5-acre and 1-acre circles at each scale; an inch rule; a rule for measuring scale of photos; and a protractor. Red or black line prints. U. S. Forest Service, Washington, D. C.* $1.30. Also available from U. S. Forest Service, Milwaukee, Wisc.* with 3 scale-protractors on 8" x 10" positive film in black. $1.25 per sheet.

Crown Diameter Scale. For measuring crown diameter of trees on aerial photographs of any scale. Dots with diameter in thousandths of an inch printed in red or black on transparent film. U. S. Forest Service, Washington, D. C.* $0.90.

Wedges for Measuring Tree Crowns and Shadows on Aerial Photos. Conventional shadow wedge printed on heavy transparent film. For compactness wedge is broken into 3 sections. Rated as poor for measurement of small crowns or shadows. Timber Survey Aid No. 2: For any scale reading in thousandths of an inch, with a maximum of .28 inches. Timber Survey Aid No. 3: Reading directly in feet for a scale of 1:20,000. Pacific Northwest Forest & Range Experiment Station.*

Percent Slope Scale. For determining percent of slope on 1:20,000 aerial photos. Use described in Central States Forest Experiment Station Note No. 53. Red or black ozachrome transparency. U. S. Forest Service, Washington, D. C.* $0.90.

Aerial Photo Rules, 1:11,000; 1:11,500; 1:12,000; 1:12,500; 1:13,000; 1:19,000; 1:20,000; 1:21,000; and 1:22,000. Each photo rule is printed on one scale. Provides for determining scale of photo, measuring stereo-base and distance in chains, estimating height directly in feet by parallax wedge method, measuring crown diameter in feet, and judging percent of crown closure. In addition, dot and square grids covering 1 square mile are given. Each dot equals 1 acre; each square 0.4 acre. Instructions for use may be obtained from the Lake States Forest Experiment Station. Printed in black on clear photographic film. Buckbee Mears Company (Attention S. W. Ryan), 900 Lindeke Building, St. Paul 1, Minn. $2.50.

Aerial Photo Rules, 1:19,000; 1:20,000; 1:21,000; and 1:22,000. Similar to above. Ozachrome copies on clear film with red (or other color) lines. Rogers & Co.(Attention Mr. Schullberg), 815 Marquette Avenue, Minneapolis 2, Minn. $0.65.

---

*See page 2 for complete address.

AREA MEASUREMENT AIDS

Acreage Measuring Grid. Grid with 64 squares to the square inch printed on transparent film in red or black. For any scale. Sheets approximately 6½" x 8½". U. S. Forest Service, Washington, D. C.* $1.30.

Acreage Grids for Use on 1:20,000 Scale Photos or Maps. Each dot equals 0.625 acres; may also be used to scale distances down to 1/2 chain. Printed on positive film. U. S. Forest Service, Milwaukee, Wis.* Specify film size:

4½" x 6½" (1 square mile) - $0.85

8" x 10" (4 square miles) - $1.25

Acreage Grid for Use on 1:15,840 Scale Photos or Maps. Each dot equals 2.5 acres. May also be used to scale distances down to 1/2 chain. Printed on positive film. U. S. Forest Service, Milwaukee, Wis.* Specify film size:

4½" x 6½" (1 square mile) - $0.85

8" x 10" (4 square miles) - $1.25

Acreage Grid for Use on 1:17,350 Scale Photos. Each dot equals 2.5 acres. Printed on positive film. U. S. Forest Service, Milwaukee, Wis.* Specify film size:

4½" x 6½" (1 square mile) - $0.85

8" x 10" (4 square miles) - $1.25

Acreage Grid for Use on 2" = 1 Mile Scale Maps. Each dot equals 2.5 acres. Printed on a positive film 16" x 20", the grid covers a complete township. U. S. Forest Service, Milwaukee, Wis.* $1.75.

Acreage Grid for Use on 8" = 1 Mile Enlargements. Each square equals 0.10 acres. Conversion factors on grid permit use on other common scales. Printed on positive film 8½" x 11". U. S. Forest Service, Milwaukee, Wis.* $1.25.

---

* See page 2 for complete address.

Aerial Photo-Grids. Each sheet has a dot grid (1 acre per dot), and a grid of squares (.4 acre per square), each covering at least 640 acres at one scale. Lines on square grid are 2 chains apart. Printed on clear acetate for the following scales: 1:11,000; 1:11,500; 1:12,000; 1:12,500; 1:13,000; 1:15,000; 1:15,500; 1:15,840; 1:16,000; 1:16,500; 1:17,000; 1:17,500; 1:18,000; 1:19,000; 1:20,000; and 1:21,000. Forest Protection Headquarters, Wisconsin Conservation Dept., Tomahawk, Wis. $0.33 per sheet. Large orders must be considered individually.

Area Grids. A letter-sized transparency on which is printed three area grids for use in determining small areas on photographs or maps. One grid is 1" x 4" in size and contains 64 small squares to the square inch. The second grid is 2" x 4" in size and contains 16 dots per square inch. The third grid is 4" x 4" and contains 64 dots per square inch. A table shows the number of acres represented by each dot at a number of typical photo scales. Timber Survey Aid No. 6, Pacific Northwest Forest & Range Experiment Station.*

Dot Grids, (On Large Sheets). Allegheny Forest Experiment Station grids with 4, 16, 25, or 36 dots per square inch printed on transparent film in black. Sheets approximately 14" x 17". U. S. Forest Service, Washington, D. C.* $3.60.

Dot Reading (Area) Overlays. Grid on each overlay subdivides it into squares containing 25 dots to facilitate counting. Printed on transparent film. The Chief Cartographer, Dept. of Mines and Technical Surveys, Labelle Building, Ottawa, Canada.

Negative No. 89, 30"x36", each dot = 0.04 sq. in. $6.00

Negative No. 90, 24"x30", each dot = 1 acre at 1:15,840. . $4.00

Negative No. 91, 18"x24", each dot = ½ acre at 1:15,840. . $2.50

Negative No. 92, 15"x18", each dot = 0.01 sq. in., ... $1.50

Area Meter. Cumulative transect device for determining areas. Logline Devices, 17 Polly Lane, Glen Head, N. Y. $15.85, shipping charges prepaid.

Adisco Area Measurer (Areameter). Cumulative transect device for measuring irregularly-shaped areas. Blue denim case with zipper. Advertising Displays, Inc., Covington, Kentucky.

---

* See page 2 for complete address.

Modified Acreage Grid. 64 dots per square inch, map scales and equivalents. Acreage determination possible on maps and aerial photos of any scale Available from:

(1) Milton M. Bryan, 5014-25th Road N., Arlington 7, Va.
(2) Forestry Enterprises, 1740 K St N W., Washington 6,D.C.
(3) Forestry Suppliers, Inc., 132 Raymond Rd., Battlefield Station, Jackson 4, Minn $1 50 Quantity-lot discounts.

Dot Counter, Photo Interpreters, Type A-1. A device to enable accurate counting of various type populations. It consists of a pencil-shaped barrel with a point pricker on one end and an automatic count recorder on the other. Mast Development Company, Inc., Davenport, Iowa $29.95 (currently available at this price only on large orders).

MISCELLANEOUS AIDS

Crown Density Scales Used as a guide in estimating on photographs percent of crown closure which can in turn be converted to stand density. For use with photoson scales 1.15,840; 1:17,350; and 1.20,000. Conversion factors included. Multilithed on cardboard about 4" x 7". U. S. Forest Service, Milwaukee, Wis.* No charge. Glossy paper contact print, scales 1.15,840 or 1.20,000, U. S. Forest Service, Washington, D. C.* $0.35.

Guide for Estimating Degree of Stocking on Aerial Photos. Each 15-percent density class from 10 percent to 100 percent is printed on transparent film with size of the shaded patterns representing tree crowns corresponding approximately to a photo scale of 1.20,000. Timber Survey Aid No. 5. Pacific Northwest Forest & Range Experiment Station *

Shadow Length Measuring Scale. Allegheny Forest Experiment Station scale for measuring shadows between converging lines in 1/100 of an inch. Printed on transparent film in red or black. Sheets approximately 6½" x 8½". U. S. Forest Service, Washington, D. C.* $1 30.

Ten-Acre Plot Locator - (Also known as Principal Point Locator). For locating principal point of aerial photographs in the preparation of sample dot grids, or for indicating a central 10-acre circular plot on 1:20,000 photos. Available as black line positive print on transparent film from U. S. Forest Service, Washington, D. C.* $1 80 each. Also available as transparent red line ozachrome print from Rogers & Company, (Attention Mr. Schullberg), 815 Marquette Ave., Minneapolis 2, Minn. $0.65.

---

* See page 2 for complete address.

Photo Interpreter's Plotting Template. Adisco Template No 9-a. A variable-size plastic rectangle with gold-tone graduations in .05 inch and 1.0 mm. Advertising Displays, Inc., 419-423 Pike Street, Covington, Kentucky.

Idealized Section - By 40 Acre Units - Scale 1:20,000. Printed on transparent film. Timber Survey Aid No. 4. Pacific Northwest Forest & Range Experiment Station.*

Stereograms for Sample Forest Condition Classes, Lake States Area-Modified Infrared Photography at 1:15,840. Series of 49 stereograms printed on glossy photographic paper approximately 4" x 7". Each card consists of two views of a typical 2½ acre plot of a selected type and condition class, which can be viewed stereoscopically with a simple lens stereoscope. Text on card provides information relating to sample, species, size and density of stand, average height of trees, and information on photography and location. Each set includes an index, crown density scales, and conversion factors. U. S. Forest Service, Milwaukee, Wis.* $7.50 per set.

Aerial Photo Rule (Slide Rule). An all-metal slide rule in 10" or 6" lengths for computing photogrammetric problems. Instructions for use supplied.

10" Model (#520) with leather case. $22.25

6" Model (#700) with clip-type leather case. $13.00

The Vilan Company, 87 Nassau St., Rm 5251, New York 38, N.Y.
Pickett and Eckel, Inc., 5000 Wabash Ave., Chicago 3, Ill.

Precision Lead Sharpener. Rejean Electric Precision Drafting Lead Sharpener. Simple, neat, motor-driven lead sharpener which fits on drafting table. Puts excellent precision point on lead when used in conjunction with good-quality precision lead holder. Rejean Manufacturing Co., 234 Lormer Avenue, Benton Harbor, Mich. Approx. #13.95.

The Lands & Forests Aerial Estimator. Optical instrument for estimation of areas from aircraft. Consists of a semi-transparent spherical mirror, at the focus of which is placed a graticule of concentric circles. On the cap of the estimator is a circular slide rule relating altitudes to circle area, from which the areas of all the circles may be read. Canadian Arsenals, Ltd., Leaside, Ontario. Approx. $40.00.

---

* See page 2 for complete address.

Photo Interpreter's Navigational Plotter. A "weems type" plotter with protractor and scales of 1:100,000; 1:500,000; and 1:1,000,000 in nautical and statute miles. Advertising Displays, Inc., 419-423 Pike Street, Covington, Kentucky.

Magnifyer, Scale. 5-Power reticle graduated in .001 feet and .1 mm. and miniature protractor all in gold tones. Foldable, with achromatic, doublet lens. Advertising Displays, Inc., 419-423 Pike Street, Covington, Kentucky.